Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

DRAFT
Conditional Major, Construction / Operating
Permit: F-07-040
Marrillia Environmental, LLC
Mt. Washington, KY 40047
July 31, 2007
Martha M. Allman, Reviewer

SOURCE ID:	21-029-00045
AGENCY INTEREST:	70880
ACTIVITY:	APE20070001

SOURCE DESCRIPTION:

On June 21, 2007, Marrillia Environmental, LLC ("Marrillia"), filed an application to incinerate wood by means of a mechanical combustion unit (MCU - also known as an air curtain incinerator) in Mt. Washington, KY. An air curtain incinerator operates by forcefully projecting a curtain of air across an open, integrated combustion chamber (fire box) or open pit or trench (trench burner) in which combustion occurs. An 88-horsepower diesel combustion engine will provide air/oxygen across the opening of the MCU to provide for more complete combustion and to control particulate matter.

Marrillia proposes to incinerate only clean lumber, wood waste, and yard waste in a fire box-type of air curtain incinerator. As defined in 40 CFR 60.2265, clean lumber includes wood or wood products that have been cut or shaped and include wet, air-dried, and kiln-dried wood products. Clean lumber does not include wood products that have been painted, pigment-stained, or pressure-treated by compounds such as chromate copper arsenate, pentachlorophenol, and creosote. Wood waste includes untreated wood and untreated wood products, including tree stumps (whole or chipped), felled trees, tree limbs (whole or chipped), bark, sawdust, chips, scraps, slabs, millings and shavings. Yard waste includes grass, grass clippings, bushes, shrubs, and clippings from bushes and shrubs, which come from residential, commercial, retail, institutional, or industrial sources as part of maintaining yards or other private or public lands. None of these activities includes construction, renovation, and demolition wastes.

Wood material will be hauled in by truck and stored in bins prior to incineration. After incineration, the ash will be mixed with dirt by a dozer onsite to be used later as fill dirt as part of Marrillia's excavation operations.

Mt. Washington is in Bullitt County, which is non-attainment for ozone[1] and $PM_{2.5}$. To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, Marrillia proposes to limit VOC and PM emissions to under 100 tons per year by limiting its operating hours to 2125 hours per year and limiting the rate at which material is burned (charging rate) to 7.65 tons per hour. However, the 7.65 tons per hour limitation appears to have been designed to ensure compliance with 401 KAR 59:010, New Process Operations, which was

1 The Louisville, KY area has been redesignated as attainment effective August 7, 2007.

erroneously applied. The correct regulations are 40 CFR 60 Subpart CCCC, Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced after November 30, 1999 and 401 KAR 59:020, New Incinerators, applicable to each incinerator with a charging rate of more than 50 tons per day commenced after August 17, 1971.

401 KAR 59:020 limits particulate matter emissions to 0.18 g/dscm (0.08 gr/dscf) corrected to 12 percent carbon dioxide excluding the contribution of carbon dioxide from the auxialiary fuel. It is not certain whether limiting the charging rate is necessary to comply with this emission limit. The application contained only emission factors in terms of pounds per ton of wood burned, which is not in units of the emission standard. The application did contain the results of Method 5 testing, "Final Report Describing Particulate and Carbon Monoxide Emissions from the Whitton S-127 Air Curtain Destructor" dated December 26, 2000, but lacked the appendices which provide the Method 5 data. However, a copy of the full report with appendices was available at www.airburners.com and is appended to this Statement of Basis. The data in Appendix A of that report, "Method 5 Calculation Sheet", suggests that the emissions would exceed the standard when corrected to 12 percent carbon dioxide. However, it is uncertain how relevant this data is to the proposed air curtain incinerator, and the only way to be certain would be to test the actual device to determine if the particulate matter emissions limit can be achieved at maximum operating capacity. Since it is unknown what impact the charging rate would have on particulate matter emissions, the typical method of monitoring process inputs and multiplying by emission factors to estimate emissions would not yield desired results until a relationship, if any, is established through testing. Therefore, to satisfy periodic monitoring requirements, the applicant shall make daily qualitative observations when the unit is in operation and if emissions are visible, shall perform a Reference Method 9 opacity test. During the required initial and subsequent annual particulate matter testing, Reference Method 9 tests shall be taken simultaneously in order to determine the correlation between particulate matter mass emissions with opacity. The testing shall also include varying input quantities to determine the impact on particulate matter emissions levels, and whether or not reducing the charging rate is necessary to meet emission limitations.

Some limitations in hours of operation or charging rate or both are necessary to limit emissions below 100 tons for each pollutant annually to avoid applicability of New Source Review. The vast majority of emissions are emitted by the air curtain incinerator, while the diesel engine and material handling activities not only emit much smaller quantities, their highest pollutants do not coincide with the pollutants that limit the air curtain incinerator. The limiting pollutant for the air curtain incinerator is volatile organic compounds (89.41 tons per year as proposed), whereas the highest emitted pollutant by the diesel generator is NO_X (2.90 tons per year) and the highest emitted pollutant for material handling is fugitive emissions (1.36 tons per year). To limit the number of calculations necessary to show compliance with the 100 ton annual limit, the air curtain incinerator shall be limited to 90 tons of emissions per 12-consecutive months for each pollutant, which is approximately equal to the level of emissions proposed in the the application. Ten tons should be an adequate cushion to account for the emissions from the smaller units as well as to ensure that 100 tons of any pollutant are not exceeded. Accordingly, operating limits shall be established to ensure that activity levels do not exceed the levels proposed in the application. The diesel generator shall be limited to 2125 hours of operation per 12-consecutive months, and the material handling operations will be limited to 16,256 tons of clean lumber, wood waste, and yard waste per 12-consecutive months.

To provide assurance that only wood waste, clean lumber, and yard waste is burned, Marrillia has proposed video taping each load as it is being dumped. If undesirable material is found in a load, it will be separated and the contractor will be warned and charged for proper disposal at a landfill. In the event a second load contains undesirable material, it will be rejected, and the contractor will be barred from further deliveries. On-site personnel will be trained to know the difference between wood that can be burned and material that cannot be burned. Each load will be logged when inspected and records will be kept on site. Scales will be used to weigh material prior to burning and records will be kept of hours of operation.

EMISSIONS SUMMARY

The following table summarizes Marrillia's potential to emit regulated pollutants. The "Maximum Potential to Emit" is based upon the maximum capacity of the unit, 10 tons/hour at 8760 hours per year, or 87,600 tons of wood burned per year. The "Potential to Emit with Limits" is based upon a limit of 16,256[2] tons of wood burned per year.

Pollutant	Maximum Potential to Emit	Potential to Emit with Limits
PM/PM10	85.41	15.85
VOC	484.80	89.41
NOX	17.52	3.25
CO	56.94	10.57
SO2	4.38	0.81
HAPs	0.02	0.005

EMISSION UNIT DETAILS

1. <u>Emission Unit 01, Mechanical Combustion Unit</u>

Description: Air Curtain Incinerator, Whitton Technologies Model S327, rated capacity 10 tons per hour

40 CFR 60 Subpart CCCC[3] and 401 KAR 59:020[4] are applicable to this emission unit. Pursuant to 40 CFR 60.2020(i), air curtain incinerators that burn only 100% wood waste, 100% clean lumber, or 100% mixture of only wood waste, clean lumber, and/or yard waste are only required to meet the requirements under "Air Curtain Incinerators" (40 CFR 60.2245 through 60.2260).

2 16,256 tons per year = 2125 hours per year times 7.65 tons per hour, rounded down

3 Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced after November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001

4 New incinerators, applicable to each incinerator with a charging rate of more than 50 tons per day commenced after August 17, 1971.

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, VOC and PM emissions from the air curtain incinerator shall not exceed 90 tons per year, each. Compliance with these limits shall be determined by the following formulas:

VOC emissions (tons) = tons of wood burned in every 12-consecutive months times an emission factor of 11 lbs./ton divided by 2000 lbs/ton
PM emissions (tons) = tons of wood burned in every 12-consecutive months times an emission factor of 2 lbs/ton divided by 2000 lbs/ton

The PM emission factor of 2 lbs/ton shall be used until such time as a PM emission factor is developed through permit required testing.

Proper operation of the air curtain incinerator is necessary to ensure compliance with emission limits, in particular:

a. The blower generating the air curtain must remain on to ensure that material does not flame or cause smoke.
b. Material must not be added in such a manner as to be stacked above the air curtain.
c. An operator shall remain with the air curtain incinerator at all times when it is operating.

Pursuant to 401 KAR 59:020, Section 5, a nameplate shall be installed in a conspicuous place on the unit giving the manufacturer's name, model number, rated capacity, and the types of waste material for which the unit is designed.

Pursuant to 40 CFR 60.2250, within 60 days after the air curtain incinerator reaches the charge rate at which it will operate, but no later than 180 days after its initial startup, opacity shall not exceed 10% (6-minute average), except the opacity limitation shall not exceed 35% during the startup period that is within the first 30 minutes of operation.

401 KAR 59:020, Section 3(1) limits opacity to 20%. However, as the federal requirement is more restrictive, compliance with the federal limit ensures compliance with the state limit.

Pursuant to 401 KAR 59:020, Section 3(3), particulate matter shall not exceed 0.18 g/dscm (0.08 gr/dscf) on a one-hour average corrected to 12% carbon dioxide excluding the contribution of carbon dioxide from auxiliary fuel.

Reference Method 9 of 40 CFR Part 60, Appendix A, shall be used to determine compliance with the opacity limitation and Reference Method 5 shall be used to determine the concentration of particulate matter. An initial test for opacity and particulate matter shall be conducted as specified in 40 CFR 60.8, 401 KAR 50:045, Performance Tests and 401 KAR 59:020, New Incinerators. The Reference Method 9 tests shall be taken simultaneously with the particulate matter testing in order to determine the correlation between particulate matter mass emissions with opacity. The testing shall also include varying input quantities to determine the impact on particulate matter emissions levels, and whether or not reducing the charging rate is necessary to meet emission limitations. After the initial tests, annual tests shall be conducted no more than 12 months following the previous test.

Daily qualitative observations shall be made when the unit is in operation and if emissions are visible, a Reference Method 9 opacity test shall be performed.

Pursuant to 401 KAR 59:020, Section 4, daily charging rates and hours of operation shall be monitored and recorded.

Pursuant to 40 CFR 60.2260(b), the owner or operator shall keep records of results of all initial and annual tests onsite for at least 5 years and shall make them available upon request.

Pursuant to 40 CFR 60.2260(d), the owner or operator shall submit the results (each 6-minute average) of the initial tests no later than 60 days following the initial test. Annual test results shall be submitted within 12 months following the previous report.

Pursuant to 40 CFR 60.2260(a) prior to commencing construction, the following shall be submitted:

a. Notification of intent to construct air curtain incinerators.
b. Planned initial startup date.
c. Types of materials that will be burned in the air curtain incinerator[5].

2. <u>Emission Unit 02, 88-hp Diesel Engine, 2007 model year</u>

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, this emission unit shall not exceed 2125 hours of operation per 12-consecutive months.

40 CFR 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to this unit. For small engines such as being proposed here, pursuant to 40 CFR 60.4211(c) compliance is achieved first by purchasing an engine certified to the emission standards in 40 CFR 60.4204(b). 40 CFR 60.4204(b) specifies that NOX emissions shall not exceed 9.2 g/hp-hour.

The engine shall also be installed, configured, and operated according to the manufacturer's specifications and use fuel that complies with EPA regulations. Specifically:

a. Pursuant to 40 CFR 60.4207(a) beginning October 1, 2007, diesel fuel shall meet the requirements of 40 CFR 80.510(a).
b. Pursuant to 40 CFR 60.4207(b) beginning October 1, 2010, diesel fuel shall meet the requirements of 40 CFR 80.510(b)
c. Pursuant to 40 CFR 60.4211(a) the engine and any control device shall be operated according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer. In addition, owners and operators may only change those settings that are permitted by the manufacturer. The requirements of 40 CFR Parts 89, 94, and/or 1068 shall be met if applicable.

5 Per the application, only clean lumber, wood waste, and yard waste shall be burned.

3. Emission Unit 03, Wood and Ash Handling

401 KAR 63:010, Fugitive emissions is applicable to each affected facility which emits or may emit fugitive emissions and is not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality.

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, the amount of material handled shall not exceed 16,256 tons per year.

Pursuant to 401 KAR 63:010, Section 3, reasonable precautions shall be taken to prevent particulate matter from becoming airborne. Such reasonable precautions shall include, when applicable, but not be limited to the following:

(i) Application and maintenance of asphalt, water, or suitable chemicals on roads, material stockpiles, and other surfaces which can create airborne dusts;
(ii) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials, or the use of water sprays or other measures to suppress the dust emissions during handling;
(iii) Maintenance of paved roadways in a clean condition;
(iv) The prompt removal of earth or other material from a paved street which earth or other material has been transported thereto by trucking or other earth moving equipment or erosion by water;
(v) Installation and use of compaction or other measures to suppress the dust emissions during handling.

Pursuant to 401 KAR 63:010, Section 3, discharge of visible fugitive dust emissions beyond the property line is prohibited.

Pursuant to 401 KAR 63:010, Section 4, no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway.

REGULATIONS NOT APPLICABLE

40 CFR 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, does not apply because the estimated potential to emit hazardous air pollutants does not exceed 10 tons for any single HAP nor 25 tons of combined HAPs.

EMISSION AND OPERATING CAPS DESCRIPTION:

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, VOC and PM emissions from the air curtain incinerator shall not exceed 90 tons per year, each. Compliance with these limits shall be determined by the following formulas:

VOC emissions (tons) = tons of wood burned in every 12-consecutive months times an emission factor of 11 lbs./ton divided by 2000 lbs/ton
PM emissions (tons) = tons of wood burned in every 12-consecutive months times an emission factor of 2 lbs/ton divided by 2000 lbs/ton

The PM emission factor of 2 lbs/ton shall be used until such time as a PM emission factor is developed through permit required testing.

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, this Emission Unit 2, diesel generator, shall not exceed 2125 hours of operation per 12-consecutive months.

To preclude applicability of 401 KAR 51:052, Review of new sources in or impacting nonattainment areas, the amount of material handled shall not exceed 16,256 tons per year.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.